

# Non- Alcoholic Fatty Liver Disease In HIV is Associated With Age And Metabolic Factors But Not HIV- Specific Parameters In A Prospectively Characterised Cohort

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**Background**

- The worldwide prevalence of non- alcoholic fatty liver disease (NAFLD) is about 25%
- NAFLD is a spectrum of disease, including simple steatosis, NASH and fibrosis
- Disease incidence is increasing in parallel with obesity and the metabolic syndrome
- NAFLD may be more common in HIV
- There is controversy in the literature on the role of HIV- specific risk factors in the development and progression of disease.

**Aims**

1. Characterise our cohort of patients with HIV mono-infection and NAFLD; 2. Identify the risk factors associated with NAFLD and fibrosis.

**Methods**

- Prospective cross- sectional case control study
- Clinical data collected from specialised fatty liver/ HIV clinic
- All patients had fasted bloods and transient elastography
- Inclusion criteria: HIV mono-infection, steatosis on USS
- Exclusion: Viral hepatitis B&C, excess alcohol, other chronic liver disease
- Significant fibrosis defined as liver stiffness  $\geq 7.1$ kPa.
- Risk factors for disease were explored using univariate analysis for NAFLD (vs age- and sex- matched HIV mono-infected controls) and fibrosis (within NAFLD cohort)

**Results**

- Patients recruited from March-December 2016
- 65 patients enrolled (excluded: alcohol n=16, HVC n=2, HBV n=1, testosterone n=2).
- Cohort characteristics in Table 1
- 17 (26%) had significant fibrosis (LSM  $\geq 7.1$ kPa)
- BMI (p<0.001), waist circumference (p<0.001) and dyslipidaemia (p=0.006) associated with NAFLD vs controls (n=14).
- No association with duration of HIV, CD4 nadir or drug exposure
- Age (p=0.039), BMI (p=0.026), ferritin (p=0.007) and GGT (p=0.018) associated with significant fibrosis (Table 2)

**Table 1**

Variable	NAFLD Cohort	Variable	NAFLD Cohort
Age	44 (40-52)	Duration of HIV (yrs)	10 (3-14)
Male (%)	95	ALT	66 (46-86)
Waist Circ (cm)	98 (90-105)	AST	43 (36-52)
Hip Circ (cm)	97 (90-105)	APRI	0.65 (0.44-0.86)
BMI	28 (26-32)	FIB-4	0.95 (0.55-1.42)
Type 2 Diabetes (%)	9	NFS	-2.24 (-3.05- -0.90)
Hypertension (%)	20	Liver Stiffness (kPa)	5.5 (4.1-7.2)
Dyslipidaemia (%)	34	CAP	286 (240-338)

**Table 2**

Variable	Simple Steatosis	Fibrosis	P value
Age (yrs)	42 (37-50)	49 (44-55)	<b>0.039</b>
<b>Metabolic</b>			
BMI (kg/m <sup>2</sup> )	27 (24-32)	31 (27-35)	<b>0.026</b>
Waist Circ (cm)	98 (91-107)	108 (94-120)	0.146
Diabetes (%)	9	13	0.648
<b>HIV History</b>			
Duration of HIV (yrs)	10 (3-14)	10 (5-16)	0.575
Diagnosis to Treatment (months)	15 (2-31)	10 (1-51)	0.846
<b>Cumulative drug exposure (months)</b>			
NRTI	64 (27-128)	58 (39-171)	0.579
NNRTI	22 (3-88)	47 (0-107)	0.652
PI	0 (0-21)	0 (0-0)	0.495
II	0 (0-7)	0 (0-0)	0.289
D-Drug	0 (0-0)	0 (0-0)	0.489
<b>Biochemistry</b>			
ALT (U/L)	71 (46-85)	63 (45-98)	0.952
AST (U/L)	42 (35-51)	45 (38-54)	0.323
GGT (U/L)	47 (37-77)	82 (61-95)	<b>0.018</b>
Ferritin (µmol/L)	89 (61-162)	296 (166-398)	<b>0.007</b>

## NAFLD in HIV: The Story So Far....\*

	Cross- Sectional Associations		Disease progression and outcomes (Longitudinal Studies)	
Metabolic Syndrome	NAFLD	NASH/Fibrosis	NAFLD	NASH/Fibrosis
Antiretroviral Drugs	Yes	Yes	Yes**	Yes**
HIV Virus	No	No (limited data)	No Data	No Data
CD4 Nadir	No	No (limited data)	No Data	No Data
Immune activation/ translocation	No Data	No Data	No Data	No Data

**Conclusions**

- Obesity is associated with the development of NAFLD and related fibrosis, independently of HIV.
- This supports current literature, but more histological data on NASH/ fibrosis and longitudinal studies are required to assess whether HIV potentiates traditional metabolic risk factors in disease incidence and progression.

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\* Based on Systematic review by our group (pending publication)  
 \*\* Based on studies in the general population. No Data for HIV infected patients.